

**CUMMINS ENGINE COMPANY, INC**

Columbus, Indiana 47201

**ENGINE PERFORMANCE CURVE**

Basic Engine Model:

**KTA50-G8**

Curve Number:

**FR-6243 (1P / 2L)****FR-6351 (2P / 2L)**

Page No.

Engine Critical Parts List:

**CPL: 2354 (1 Pump / 2 Loop)****CPL: 2859 (2 Pump / 2 Loop)**

Date:

**5Mar04**Displacement : 50.3 litre (3067 in<sup>3</sup>)

Bore : 159 mm (6.25 in.) Stroke : 159 mm (6.25 in.)

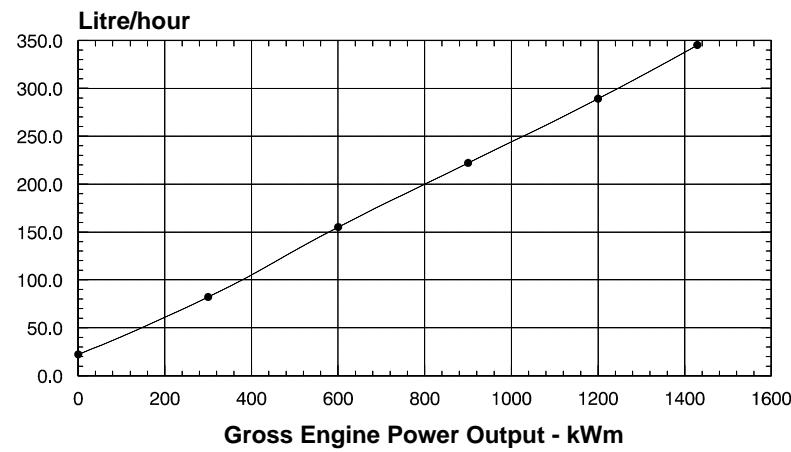
No. of Cylinders : 16

Aspiration : Turbocharged and Low Temperature Aftercooled

Engine Speed	Standby Power		Prime Power		Continuous Power		
	RPM	kWm	BHP	kWm	BHP	kWm	BHP
1500		1429	1915	1200	1608	1100	1475

**Engine Performance Data @ 1500 RPM**

OUTPUT POWER			FUEL CONSUMPTION			
%	kWm	BHP	kg/kWm-h	lb/BHP-h	litre/hour	U.S. Gal/hour
<b>STANDBY POWER</b>						
100	1429	1915	0.206	0.338	345	91.2
<b>PRIME POWER</b>						
100	1200	1608	0.205	0.337	289	76.3
75	900	1206	0.210	0.346	222	58.7
50	600	804	0.220	0.362	155	40.9
25	300	402	0.233	0.383	82	21.7
<b>CONTINUOUS POWER</b>						
100	1100	1475	0.206	0.339	266	70.4



These guidelines have been formulated to ensure proper application of generator drive engines in A.C. generator set installations. Generator drive engines are not designed for and shall not be used in variable speed D.C. generator set applications.

**STANDBY POWER RATING**

Applicable for supplying emergency power for the duration of the utility power outage. No overload capability is available for this rating. Under no condition is an engine allowed to operate in parallel with the public utility at the Standby Power rating. This rating should be applied where reliable utility power is available. A Standby rated engine should be sized for a maximum of an 80% average load factor and 200 hours of operation per year. This includes less than 25 hours per year at the Standby Power rating. Standby ratings should never be applied except in true emergency power outages. Negotiated power outages contracted with a utility company are not considered an emergency.

**PRIME POWER RATING**

Applicable for supplying electric power in lieu of commercially purchased power. Prime Power applications must be in the form of one of the following two categories:

**UNLIMITED TIME RUNNING PRIME POWER**

Prime Power is available for an unlimited number of hours per year in a variable load application. Variable load should not exceed a 70% average of the Prime Power rating during any operating period of 250 hours. The total operating time at 100% Prime Power shall not exceed 500 hours per year. A 10% overload capability is available for a period of 1 hour within a 12-hour period of operation. Total operating time at the 10% overload power shall not exceed 25 hours per year.

**LIMITED TIME RUNNING PRIME POWER**

Limited Time Prime Power is available for a limited number of hours in a non-variable load application. It is intended for use in situations where power outages are contracted, such as in utility power curtailment. Engines may be operated in parallel to the public utility up to 750 hours per year at power levels never to exceed the Prime Power rating. The customer should be aware, however, that the life of any engine will be reduced by this constant high load operation. Any operation exceeding 750 hours per year at the Prime Power rating should use the Continuous Power rating.

**CONTINUOUS POWER RATING**

Applicable for supplying utility power at a constant 100% load for an unlimited number of hours per year. No overload capability is available for this rating.

**CONVERSIONS:** (Litres = U.S. Gal x 3.785)

(kWm = BHP x 0.746)

(U.S. Gal = Litres x 0.2642)

(BHP = Engine kWm x 1.34)

Data shown above represent gross engine performance capabilities obtained and corrected in accordance with ISO-3046 conditions of 100 kPa (29.53 in Hg) barometric pressure [110 m (361 ft) altitude], 25 °C (77 °F) air inlet temperature, and relative humidity of 30% with No. 2 diesel or a fuel corresponding to ASTM D2.

See reverse side for application rating guidelines.

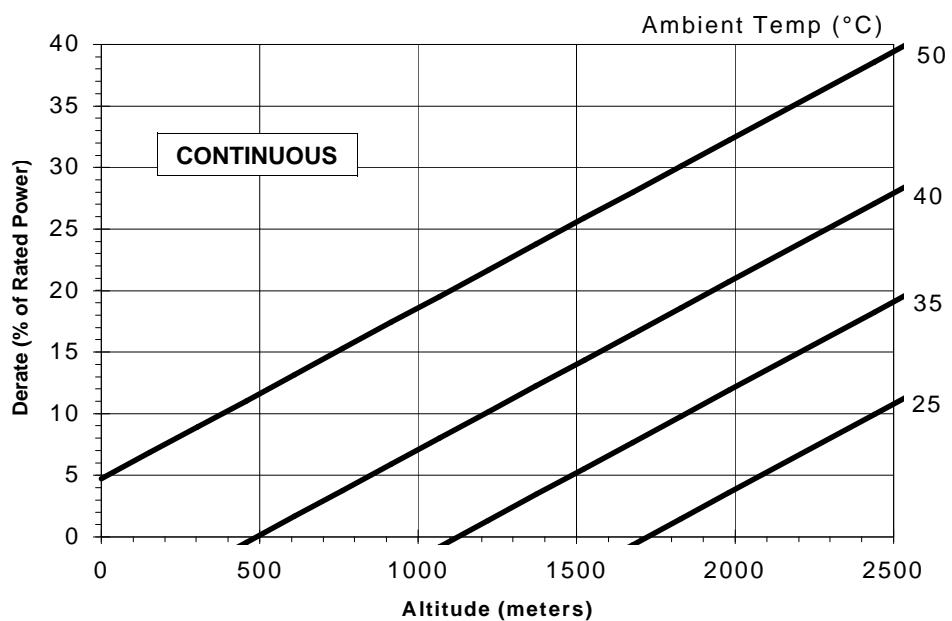
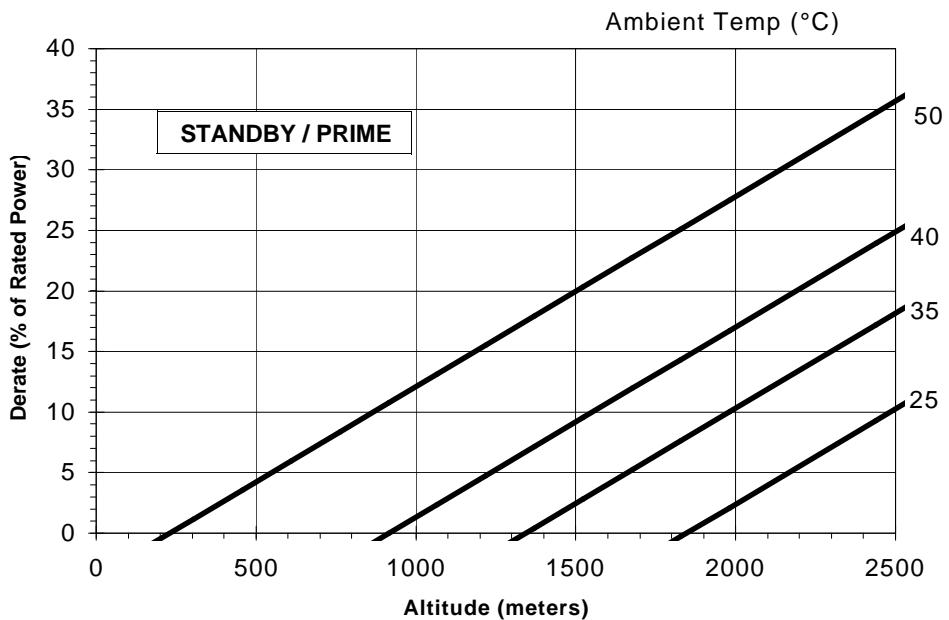
The fuel consumption data is based on No. 2 diesel fuel weight at 0.85 kg/litre (7.1 lbs/U.S. gal).

Power output curves are based on the engine operating with fuel system, water pump and lubricating oil pump; not included are battery charging alternator, fan, optional equipment and driven components.

*D.K. Trueblood***TECHNICAL DATA DEPT.****CERTIFIED WITHIN 5%****CHIEF ENGINEER**

# KTA50-G8 Derate Curves @ 1500 RPM

CURVE NO : FR-6243  
DATE : 5Mar04



#### Reference Standards:

BS-5514 and DIN-6271 standards are based on ISO-3046.

#### Operation At Elevated Temperature And Altitude:

For sustained operation above these conditions, derate by an additional 4.6% per 300m (1000ft) and 12% per 10°C (18°F)

**NOTE:** Derates shown are based on 15" H<sub>2</sub>O air intake restriction and 2" Hg exhaust back pressure.

# Cummins Engine Company, Inc.

## Engine Data Sheet

**ENGINE MODEL :** KTA50-G8

**CONFIGURATION NUMBER :** D283022DX02

**DATA SHEET :** DS-6243

**DATE :** 5Mar04

**PERFORMANCE CURVE :** FR-6243 (1P / 2L)  
FR-6351 (2P / 2L)

### INSTALLATION DIAGRAM

- Fan to Flywheel (1P / 2L): 3170289
- Fan to Flywheel (2P / 2L): 3626419

### CPL NUMBER

- Engine Critical Parts List : 2354
- Engine Critical Parts List : 2859

### **GENERAL ENGINE DATA**

Type.....			
Aspiration .....			
Bore x Stroke .....	— in x in (mm x mm)		
Displacement.....	— in <sup>3</sup> (liter)		
Compression Ratio.....			

#### Dry Weight

Fan to Flywheel Engine.....	— lb (kg)	11820	(5360)
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#### Wet Weight

Fan to Flywheel Engine.....	— lb (kg)	12485	(5662)
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#### Moment of Inertia of Rotating Components

• with FW 6009 Flywheel .....	— lb <sub>m</sub> • ft <sup>2</sup> (kg • m <sup>2</sup> )	301	(12.7)
• with FW 6017 Flywheel.....	— lb <sub>m</sub> • ft <sup>2</sup> (kg • m <sup>2</sup> )	515	(21.7)

#### Center of Gravity from Rear Face of Flywheel Housing (FH 6024) .....

Center of Gravity from Rear Face of Flywheel Housing (FH 6024) .....	— in (mm)	47.5	(1206)
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#### Center of Gravity Above Crankshaft Centerline .....

Center of Gravity Above Crankshaft Centerline .....	— in (mm)	11.0	(279)
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#### Maximum Static Loading at Rear Main Bearing.....

Maximum Static Loading at Rear Main Bearing.....	— lb (kg)	2000	(908)
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### **ENGINE MOUNTING**

Maximum Bending Moment at Rear Face of Block.....	— lb • ft (N • m)	4500	(6100)
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### **EXHAUST SYSTEM**

Maximum Back Pressure @ Standby Power Rating .....	— in Hg (mm Hg)	2	(51)
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### **AIR INDUCTION SYSTEM**

#### Maximum Intake Air Restriction

• with Dirty Filter Element @ Standby Power Rating.....	— in H <sub>2</sub> O (mm H <sub>2</sub> O)	25	(635)
• with Clean Filter Element @ Standby Power Rating .....	— in H <sub>2</sub> O (mm H <sub>2</sub> O)	15	(381)

### **COOLING SYSTEM** (Low Temperature Aftercooling Required; 1 Pump / 2 Loop or 2 Pump / 2 Loop)

Coolant Capacity — Engine Only .....	— US gal (liter)	37	(140)
— Aftercoolers.....	— US gal (liter)	9	(34)

#### Maximum Static Head of Coolant Above Engine Crank Centerline.....

Maximum Static Head of Coolant Above Engine Crank Centerline.....	— ft (m)	60	(18.3)
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#### Thermostat Modulating Range — High Flow (Jacket) .....

Thermostat Modulating Range — High Flow (Jacket) .....	— °F (°C)	180 - 200	(82 - 93)
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#### Maximum Top Tank Temperature for Standby Power / Prime Power.....

Maximum Top Tank Temperature for Standby Power / Prime Power.....	— °F (°C)	220 / 212	(104 / 100)
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#### Target Coolant Inlet Temperature to Aftercoolers @ 77 °F (25 °C) Ambient— .....

Target Coolant Inlet Temperature to Aftercoolers @ 77 °F (25 °C) Ambient— .....	— °F (°C)	130	(55)
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#### Maximum Coolant Temperature to Aftercoolers; Standby Power / Prime Power .....

Maximum Coolant Temperature to Aftercoolers; Standby Power / Prime Power .....	— °F (°C)	160 / 150	(71 / 66)
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#### Additional 2 Pump / 2 Loop Requirements

##### Maximum Coolant Friction Head External to Engine— High Flow (Jacket).....

— Low Flow (Aftercooler).....	— psi (kPa)	10	(67)
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— Low Flow (Aftercooler).....	— psi (kPa)	5	(35)
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##### Thermostat Modulating Range — Low Flow (Aftercooler) (2P / 2L) w/ HX6123..

— Low Flow (Aftercooler) (2P / 2L) w/ HX6123..	— °F (°C)	95 - 105	(35 - 40)
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##### Minimum Pressure Cap (for Cooling Systems with less than 2 m [6 ft.] Static Head) ..

— psi (kPa)	10	(67)
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#### Additional 1 Pump / 2 Loop Requirements

##### Maximum Coolant Friction Head External to Engine— High Flow (Jacket).....

— Low Flow (Aftercooler).....	— psi (kPa)	10	(70)
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— Low Flow (Aftercooler).....	— psi (kPa)	5	(35)
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##### Thermostat Modulating Range — Low Flow (Aftercooler).....

— Low Flow (Aftercooler).....	— °F (°C)	150 - 175	(66 - 79)
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##### Minimum Pressure Cap (for Cooling Systems with less than 2 m [6 ft.] Static Head) ..

— psi (kPa)	14	(96)
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### **LUBRICATION SYSTEM**

#### Oil Pressure @ Idle Speed .....

— psi (kPa)	20	(138)
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#### Oil Pressure @ Governed Speed .....

— psi (kPa)	50 - 70	(345 - 483)
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#### Maximum Oil Temperature .....

— °F (°C)	250	(121)
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#### Oil Capacity with OP 6027 Oil Pan : High - Low.....

— US gal (liter)	47 - 39	(178 - 148)
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#### Total System Capacity (Including Bypass Filter) .....

— US gal (liter)	54	(204)
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### **FUEL SYSTEM**

#### Type Injection System .....

Direct Injection Cummins PT

#### Maximum Restriction at PT Fuel Injection Pump — with Clean Fuel Filter.....

— in Hg (mm Hg)	4.0	(102)
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#### — with Dirty Fuel Filter.....

— in Hg (mm Hg)	8.0	(203)
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#### Maximum Allowable Head on Injector Return Line (Consisting of Friction Head and Static Head).....

— in Hg (mm Hg)	6.5	(165)
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#### Maximum Fuel Flow to Injection Pump.....

— US gph (liter / hr)	151	(570)
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## ELECTRICAL SYSTEM

Cranking Motor (Heavy Duty, Positive Engagement).....	— volt	24
Battery Charging System, Negative Ground.....	— ampere	35
Maximum Allowable Resistance of Cranking Circuit.....	— ohm	0.002
Minimum Recommended Battery Capacity		
• Cold Soak @ 50 °F (10 °C) and Above.....	— 0°F CCA	1280
• Cold Soak @ 32 °F to 50 °F (0 °C to 10 °C) .....	— 0°F CCA	1800
• Cold Soak @ 0 °F to 32 °F (-18 °C to 0 °C) .....	— 0°F CCA	1800

## COLD START CAPABILITY

Minimum Ambient Temperature for Aided (with Coolant Heater) Cold Start within 10 seconds .....	— °F (°C)	50	(10)
Minimum Ambient Temperature for Unaided Cold Start .....	— °F (°C)	45	(7)

## PERFORMANCE DATA

All data is based on: • Engine operating with fuel system, water pump, lubricating oil pump, air cleaner and exhaust silencer; not included are battery charging alternator, fan, and optional driven components.

• Engine operating with fuel corresponding to grade No. 2-D per ASTM D975.

• ISO 3046, Part 1, Standard Reference Conditions of:

Barometric Pressure : 100 kPa (29.53 in Hg)	Air Temperature : 25 °C (77 °F)
Altitude : 110 m (361 ft)	Relative Humidity : 30%

Steady State Stability Band at any Constant Load ..... — % ..... +/- 0.25

Estimated Free Field Sound Pressure Level of a Typical Generator Set;

Excludes Exhaust Noise; at Rated Load and 7.5 m (24.6 ft); 1500 rpm..... — dBA ..... 92.4

Exhaust Noise at 1 m Horizontally from Centerline of Exhaust Pipe Outlet Upwards at 45° ..... — dBA ..... N.A.

Governed Engine Speed ..... — rpm

Engine Idle Speed ..... — rpm

Gross Engine Power Output ..... — BHP (kW<sub>m</sub>)

Brake Mean Effective Pressure ..... — psi (kPa)

Piston Speed ..... — ft / min (m / s)

Friction Horsepower ..... — HP (kW<sub>m</sub>)

### Engine Data with Dry Type Exhaust Manifold

Intake Air Flow ..... — cfm (liter / s)

Exhaust Gas Temperature ..... — °F (°C)

Exhaust Gas Flow ..... — cfm (liter / s)

Air to Fuel Ratio ..... — air : fuel

Radiated Heat to Ambient ..... — BTU / min (kW<sub>m</sub>)

Heat Rejection to Exhaust ..... — BTU / min (kW<sub>m</sub>)

### Additional Engine Aftercooler Data (2 Pump / 2 Loop)

Engine Jacket Coolant Flow at Stated Friction Head External to Engine:

- 4 psi Friction Head ..... — US gpm (liter / s)
- Maximum Friction Head ..... — US gpm (liter / s)

Heat Rejection to Coolant (Aftercooler) ..... — BTU / min (kW<sub>m</sub>)

Heat Rejection to Coolant (Engine) ..... — BTU / min (kW<sub>m</sub>)

Aftercooler Coolant Flow at Stated Friction Head External to Engine: .

- 2 psi Friction Head ..... — US gpm (liter / s)
- Maximum Friction Head ..... — US gpm (liter / s)

### Additional Engine Aftercooler Data (1 Pump / 2 Loop)

Engine Jacket Coolant Flow at Stated Friction Head External to Engine:

- 4 psi Friction Head ..... — US gpm (liter / s)
- Maximum Friction Head ..... — US gpm (liter / s)

Heat to be Rejected by Low Temperature Radiator\* — BTU / min (kW<sub>m</sub>)

Heat to be Rejected by Jacket Water Radiator\* — BTU / min (kW<sub>m</sub>)

Aftercooler Coolant Flow at Stated Friction Head External to Engine: .

- 2 psi Friction Head ..... — US gpm (liter / s)
- Maximum Friction Head ..... — US gpm (liter / s)

\* See AEB 90.39 1 Pump / 2 Loop KTA50-G8/9 system.

	STANDBY POWER		PRIME POWER	
	60 hz	50 hz	60 hz	50 hz
	1500		1500	
	725 - 775		725 - 775	
	1915 (1429)		1608 (1200)	
	330 (2275)		277 (1910)	
	1562 (7.9)		1562 (7.9)	
	155 (116)		155 (116)	
	3500 (1655)		3180 (1500)	
	950 (510)		900 (485)	
	9210 (4350)		8150 (3845)	
	23.2 : 1		25.1 : 1	
	12000 (210)		9900 (175)	
	54200 (954)		45270 (800)	
Not Applicable for 1800 RPM Operation	440 (27.8)		440 (27.8)	
	400 (25.2)		400 (25.2)	
	15600 (275)		11000 (195)	
	35000 (615)		30950 (545)	
	100 (6.3)		100 (6.3)	
	95 (6.0)		95 (6.0)	
	352 (22.2)		352 (22.2)	
	320 (20.2)		320 (20.2)	
	30400 (535)		30660 (540)	
	22030 (390)		11550 (205)	
	85 (5.4)		85 (5.4)	
	80 (5.0)		80 (5.0)	

**N.A.** - Data is Not Available

**N/A** - Not Applicable to this Engine

**TBD** - To Be Determined